DOCUMENT RESUME

ED 226 481 EA 015 429

AUTHOR Joplin, Alan L.
TITLE Constructing a Data Base: Perspectives, Principles and Practice.
PUB DATE Oct 80
NOTE 13p.; Some pages may reproduce poorly due to small print of original document.
AVAILABLE FROM Alan L. Joplin, 3106 Evans, Saint Louis, MO 63106 ($3.50 plus $1.00 postage).
PUB TYPE Guides - Non-Classroom Use (055) -- Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Data Analysis; *Databases; Data Collection; Decision Making; Higher Education; Information Processing; *Information Systems; Planning

ABSTRACT

The information needed for informed decision making and planning by institutions of higher education can be made available through the establishment of carefully constructed databases. This handbook outlines the characteristics of databases, the needs databases meet, the key factors around which they must be organized, the advantages they offer, and essential guidelines, design principles, and processes for database construction. (PGD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Alan L. Joplin

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

EA 015 429

CONSTRUCTING A DATA BASE: PERSPECTIVES, PRINCIPLES & PRACTICE.

By:
Alan L. Joplin

October 1980

INTRODUCTION

The need for a common data base for all levels of education has been a pressing theme in both state and federal agencies for the past decade. A common data base occupies a position of central importance in the trend toward scientific management in higher education. Although the nature and scope of such activities begin with the collection of data, the fact is that colleges and universities are beginning to study their problems very carefully -- beginning to develop all types of data regarding students, facilities, cost, and operations -- for the purpose of making informed decisions.

The pressures of declining enrollment and budget retenchment no longer allow colleges and universities the luxury of trial and error in their management procedures. The management science techniques now available permit an objective comparison of alternatives in terms of specified goals and thereby permit institutions to achieve greater efficiency in their external/internal operations.

Greater attention must be given to identifying, defining and collecting, on a systematic and timely basis, the data needed for informative decision making and planning.

The primary purpose of data collection and analysis is to base the decision making process on reliable information, gathered and analyzed over a period of time. It is assumed that institutional decision making will rest on factual and objective foundations, rather than on a figment of someone's imagination.

The trick to data base construction is to find a limited number of key factors upon which the data can be organized and updated over a period of time on a systematic basis. It will soon be discovered that as data is collected and analyzed, many new data needs will arise leading to the gathering of still more data.

THREE NEEDS SERVED BY DATA BASE CONSTRUCTION:

1. There are the day-to-day needs of various institutional components -- some independent, some interdependent. For these, the data collected and the data required will vary from component to component and from month to month, after including such routine items as class grades, loads, etc.

2. The system will also contain general reporting information on individual components and program needs with data related to sources of students, projections -- serving the kinds of reports that are developed independently for state and federal offices, and the universities administration.

3. The information system will be instrumental in institutional decision making, planning and management.

KEY INGREDIENTS OF A SUCCESSFUL DATA BASE:

1. Establishment of a comprehensive master plan including a clear set of time specified goals and objectives approved by the institution's executive managers.

2. Adequate resources to support the development and implementation of the system over a two or three year period.

3. Clear evidence of personal and professional commitment by all levels of institutional management throughout the period needed to achieve an operational system.

4. Organizational placement of the data base component at an administrative level which will reflect commitment to the activity.

5. The development of a specially designed and equipped information center.

TWO BASIC CHARACTERISTICS OF A FUNCTIONAL DATA BASE:

1. Provision of an orderly, controlled flow of data and information to and from a common source. Data and information would ideally be entered only once into the system and then used in a variety of ways.

2. Provision of a comprehensive data base, i.e., one containing accurate, current, necessary and sufficient information about the functional activities of the institution and meeting the total information requirements of the institution.

GENERAL ADVANTAGES OF A DATA BASE:

1. Provision of improved information system support to chief administrators, enabling more effective and efficient performance of their duties.

2. Provision of a more comprehensive and complete information base to strengthen the three basic administrative processes within the institution: planning, management and evaluation.

3. Provision of a comprehensive (i.e., accurate, timely, integrated). yet economical information support system to improve institutional administration and operation - including institutional research and planning activities - in accordance with established institutional priorities.

4. Minimization of routine information processing by chief administrators, supervisors and unit managers in order to maximize time alloted for planning activities by these key officials.

5. Strengthening of professional abilities of the institution's staff, wherever possible, through utilization of more advanced information technology.

GENERAL DESIGN REQUIREMENTS OF AN OPERATIONAL DATA BASE:

1. Provide an organizational - wide data base to strengthen planning, management and evaluation.

2. Assist in the routine processing of data and information.

3. Provide information to support the institution's management officials in executing their (day-to-day or long range) responsibilities.

GUIDELINES FOR DATA BASE CONSTRUCTION:

1. Select a model. (SEE FIGURE 1 - A TYPICAL DATA BASE MODEL PAGE 5)

2. Determine implementation priorities.

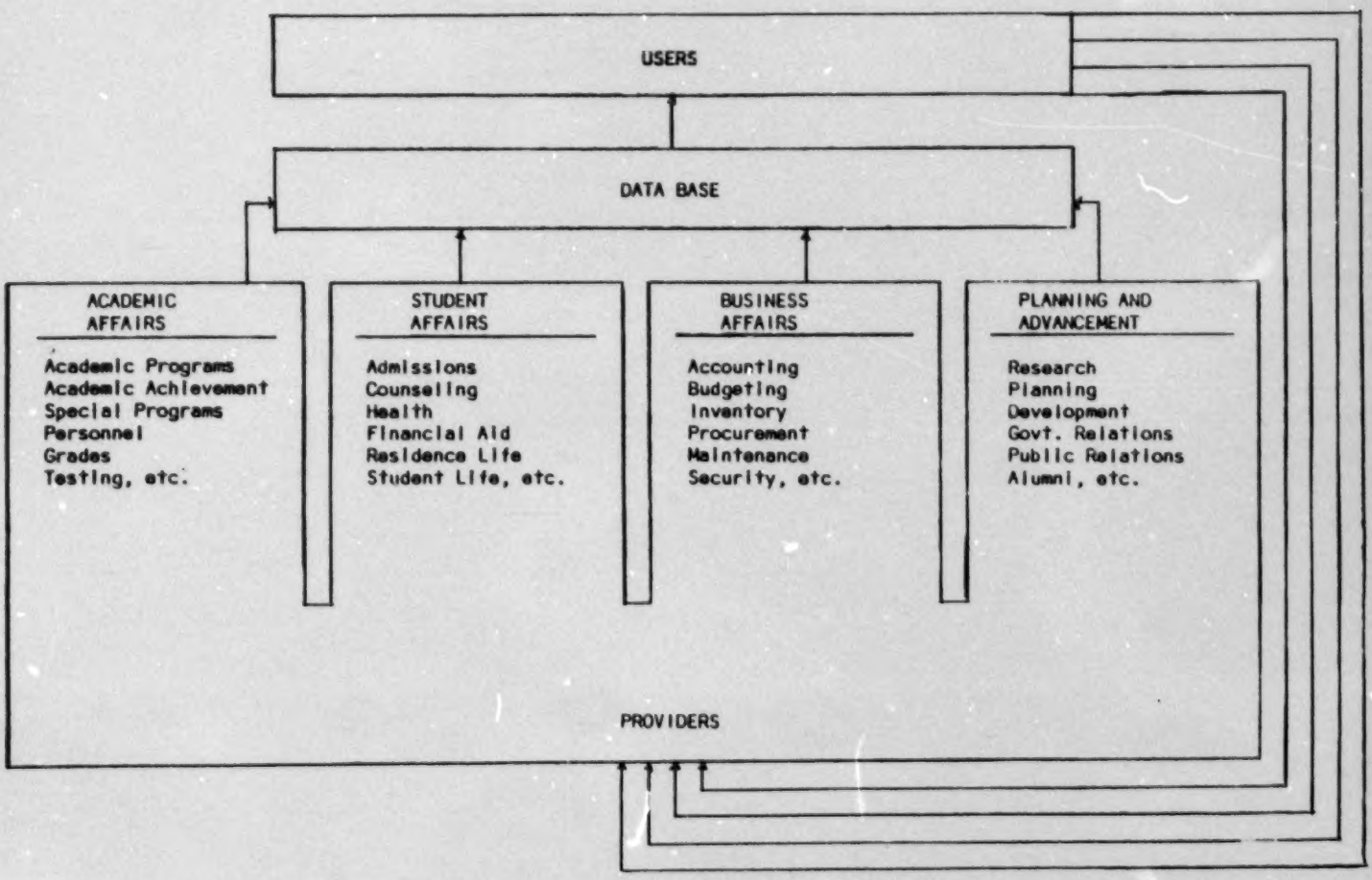
3. Determine system management.

4. Determine resources.

5. Prepare master plan.

FIGURE 1

A TYPICAL COLLEGE OR UNIVERSITY DATA BASE MODEL.



COMMON MISTAKES AND PITFALLS IN DATA BASE CONSTRUCTION.

1. Lack of an approved institutional master plan.
2. Failure to promote an understanding of its potential impact on the institution.
3. Failure to allocate adequate resources.
4. Placement in a lower level position of the administrative organi - zational structure.
5. Lack of sustained identification with the activity by all levels of management.

GUIDING PRINCIPLES OF DATA BASE CONSTRUCTION.

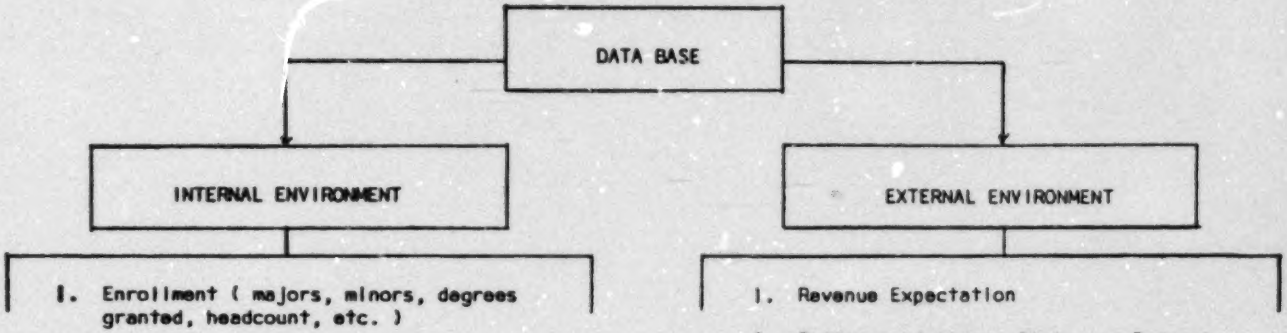
1. Information must be basic.
2. Information should provide a picture of institutional components, students, staff, instruction, facilities, etc.
3. Data from all institutional components should go to one central location.
4. Data collected should be made available for common use and analysis.
5. Data should have common definitions.
6. The system should be practical in terms of purpose, time and money.

ENVIRONMENTAL DATA NEEDS SERVED BY DATA BASE CONSTRUCTION.

1. Describe the available internal and external data. (avoid using jargon ..... use terms understood by all.)
(SEE FIGURE II - ENVIRONMENTAL DATA NEEDS SERVED BY DATA BASE CONSTRUCTION. - PAGE 7)

FIGURE II

ENVIRONMENTAL DATA NEEDS SERVED BY DATA BASE CONSTRUCTION



1. Enrollment (majors, minors, degrees granted, headcount, etc.)
2. Enrollment Projections (by levels and programs)
3. Student Attrition
4. Student Demography (race, sex, high school, residence, age, etc.)
5. Student-Performance Indicators (SAT or CAT scores, rank-in-class, projected GPA, etc.)
6. Class Size (by academic unit or program)
7. Student-Faculty Ratio (by academic unit and course level)
8. Unit Cost
9. Curriculum Interaction (course consumption and demand by, academic units)
10. Outcome Data (placement, alumni, follow-up data, etc.)
11. Faculty and Staff Work-Load Measures (contact hrs., credit hrs., etc.)

1. Revenue Expectation
2. Patterns of Local, State and Federal Aid to Post-Secondary Institutions
3. Manpower Projections
4. Demographic Trends
5. Enrollment Trends
6. Shifts in Local and Regional Educational Trends
7. Economic Trends of Region
8. Student Characteristics for the Next 5 to 10 years
9. Social and Community Priorities

STEPS IN BUILDING A DATA BASE

STEP ONE - Determine categories and sub-categories for data. These categories should be organized around the organizational structure of the institution, as characterized in the worksheets below.

WORK SHEET #1

IDENTIFICATION OF CATEGORIES AND SUB-CATEGORIES

CATEGORY	ACADEMIS AFFAIRS	STUDENT AFFAIRS	BUSINESS AFFAIRS	PLANNING AND ADVANCEMENT
SUB-CATEGORY	1. Academic Programs 2. Special Programs 3. Personnel 4. Testing 5. Academic Achievement 6. Grades, etc.	1. Admissions 2. Counseling 3. Student Health 4. Financial Aid 5. Residence Life 6. Student Life, etc.	1. Accounting 2. Budgeting 3. Inventory 4. Procurement 5. Maintenance 6. Security, etc.	1. Research 2. Planning 3. Development 4. Govt. Relations 5. Public Relations 6. Alumni, etc.

WORK SHEET #2

IDENTIFICATION OF DATA ELEMENTS

CATEGORY	STUDENT AFFAIRS			
SUB-CATEGORY	ADMISSIONS	COUNSELING	STUDENT HEALTH	FINANCIAL AID
DATA ELEMENTS	STUDENT INFORMATION: 1. Name 2. Home Address 3. S.S.# 4. College Plans 5. Personal Data 6. Previous Ed., etc.			

STEP TWO - Identify questions that require answers -- the purpose for which data is needed.

1. Collect questions from all institutional components
2. Develop a common set of questions (compile list)
3. Develop uncommon set of questions (compile list)
4. Code questions which are common to all components
5. Code questions which are specific to certain components

Identify the data elements that will be needed to answer each question.

1. Survey current data elements collected and match with common and uncommon questions
2. Develop a review process for current data collection instruments
3. Develop new data collection instruments, or revise current instruments

NOTE: The elements of a data base can be combined in a great many ways to answer questions at the institution. For example, the data base consisting of a student's address, race, standardized test scores, proportion of grades by class, degrees and credentials held by faculty, space assignments, types of space and maximum/minimum capacity can provide answers to the following questions among others:

What is the student's potential ?

How qualified is the faculty ?

Do students who reside in one area of the state or country perform any better in English than students from another?

How adequately are we using our classroom space?

Based upon a student's standardized test scores in math, English, and reading, what is the probability that he/she will earn a given math or English grade?

STEP THREE - Decided which data are primary (or basic) and which are secondary.

1. Primary Data - that which is required constantly, each quarter or year. It is reoccuring.

2. Secondary Data - that which may be unique to a given institution (something nice to know - not absolutely essential information)

STEP FOUR - Define each data elements operationally.

NOTE: Establishes common meanings as does the Handbook of Data and Definitions in Higher Education.

STEP FIVE - Determine the best means of collecting data.

1. Identify data sources

2. Identify instruments for the collection of data

3. Identify the mehtods used to analyze data -- key punch, scanner, etc.